

Serial No. 09/965,558
Atty. Doc. No. 01P17802US

Please revise the claims as indicated:

1. (currently amended) A method of making an insulating material used as a thermal insulating layer, comprising the steps:

providing a first ~~permeable structure having a contacting surface that is permeable to a liquid portion of a slurry comprising a binder but that is not permeable to a solid portion of the slurry;~~

providing a second permeable structure ~~parallel and~~ at a distance away from the first ~~permeable structure~~ thereby defining a first void between the first and second permeable structures;

placing geometric shapes in the void between the first and second permeable structures;

A³ providing an impermeable restraining structure ~~parallel to the second permeable structure~~ a distance away from the second permeable structure and opposite the first permeable structure defining a second void between the second permeable structure and the impermeable structure;

~~permeable~~ introducing the slurry into the void between the second permeable structure and the impermeable structure ~~one of a binder/filler particle slurry or a binder medium;~~ and

applying pressure in the void between the second permeable structure and the impermeable structure forcing the slurry through the second permeable structure and around the geometric shapes filling in any voids adjacent the geometric shapes and being forced against the first ~~permeable structure~~;

drying the slurry around the geometric shapes to form a matrix material; and
heating the matrix material to form the insulating material.

2. (currently amended) The method of according to claim 1 further comprising the step of, compacting the geometric shapes in the first void between the first and second permeable structures after placement of the geometric shapes in the first void.

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3. (currently amended) The method of according to claim 1 further comprising an extracting member located ~~perpendicular and adjacent to the first permeable restraining structure~~ in direct contact with the geometric shapes ~~wherein the extracting member and the second permeable member defines the first void.~~

4. (currently amended) The method of according to claim 3 wherein the step of applying pressure further comprises forcing the slurry into the second void through the first ~~permeable structure~~ around the geometric shapes and against the extracting member.

5. (currently amended) The method of according to claim 4 wherein the step of applying pressure and forcing the slurry against the extracting member thereby causing capillary wicking of ~~the liquid~~ from the slurry due to the extracting member and further extracting any excess liquid from the slurry.

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6. (currently amended) The method of according to claim ~~5~~ 4, wherein the step of applying pressure causes capillary wicking of liquid from the slurry to form the matrix material, and further comprising the step of removing the insulating material from the chamber and drying in the insulating material matrix material at a drying temperature for an amount of time sufficient to dry the insulating material matrix material to a green state.

7. (currently amended) The method of according to claim 6 further comprising the step of firing the insulating material after the drying step at a temperature at least to 1200°C ~~for an amount of time to produce a matrix binder.~~

8. (cancelled)

9. (currently amended) The method of according to claim ~~8~~ 7 wherein the heat drying and firing steps occur at a temperatures between 80-120°C and 1,000-1600°C degrees respectively ~~and for an amount of time between 2hrs and 12hrs.~~

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10. (currently amended) The method of according to claim 8 ~~9~~ wherein the ~~step-step~~ of ~~drying and firing~~ comprises ramping wherein the temperature is ~~ramp-up~~ at a rate between 5-3 degrees per minute and 10 degrees per minute ~~up to between from~~ 120° C and to 1600° C.

11. (currently amended) The method of according to claim 1 wherein the first and second permeable ~~structure-structures~~ and the impermeable structure are formed in a respective geometric shape-shapes dependant upon the a planned use of the ~~ceramic~~ insulating material as a thermal insulating layer.

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12. (currently amended) A method of making a ceramic material, ~~formed into geometric shapes and used~~ for use as a thermal barrier layer, comprising the steps:

providing a permeable structure having a first surface;

providing a fibrous material adjacent to the first surface of the permeable structure;

providing a porous membrane ~~parallel and~~ at a distance from the fibrous material, wherein the porous membrane and fibrous material ~~defines~~ define a sphere chamber;

placing hollow spheres into the sphere chamber;

providing a an impermeable structure ~~positioned parallel and~~ at a distance from the ~~fibrous material~~ porous membrane, wherein the porous membrane and impermeable structure ~~defines~~ define a slurry chamber;

placing a flowable slurry into the slurry chamber; ~~and~~

applying pressure into the slurry chamber such that the slurry infiltrates through the porous membrane and around the hollow spheres and against the fibrous material;

removing liquid from the slurry in the slurry chamber to form a matrix material around the hollow spheres; and

heating the matrix material to form the ceramic material for use as a thermal barrier layer.

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13. (currently amended) The method according to claim 12 wherein the permeable structure and the ~~extraction membrane provides~~ fibrous membrane provide a means for capillary wicking of ~~the liquid from the slurry through the extraction membrane~~ permeable structure.

14. (original) The method according to claim 12 wherein the slurry comprises oxide filler and aluminum phosphate and a liquid.

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15. (currently amended) The method according to claim 12 wherein the porous membrane is a perforated sheet of material defining plurality of holes therein having a diameter to allow ~~and an~~ an even flow of the slurry to pass therethrough and provides an even distribution of the slurry into the sphere chamber around the spheres.

16. (currently amended) The method according to claim 12 wherein the hollow spheres are selected from the group consisting of Mullite, Alumina, Zirconia ~~or~~ and any combination thereof.

17. (currently amended) The method according to claim 12 wherein the fibrous material ~~is comprises~~ comprises aluminosilicate fibers.

18. (original) The method according to claim 12 wherein the step of applying pressure is achieved by applying 5 to 20 psi of pressure.

19. (currently amended) The method according to claim 12 further comprising the step of:
continuing the step of applying pressure to wick liquid out of the slurry through the fibrous material to dry the slurry to form the matrix material; and
removing the ceramic-matrix material from the sphere chamber and drying in the ceramic-matrix material at a drying temperature for an amount of time to dry the ceramic-matrix material to a green state.

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20. (currently amended) The method according to claim 19 further comprising the step of firing the ~~ceramic~~ matrix material after the drying step at a temperature at least to 1200°C for a ~~predetermined amount of time~~.

21. (currently amended) The method ~~of~~ according to claim 20 wherein the ~~steps~~ step of drying the ~~ceramic~~ matrix material further ~~consists of~~ comprises heating the ~~ceramic~~ matrix material.

A³ 22. (currently amended) The method ~~of~~ according to claim 21 wherein the heat drying and firing steps occur at a temperature between 100° C and 1500° C degrees and for an amount of time up to 12 hours.

23. (currently amended) The method ~~of~~ according to claim 20 wherein the step of drying and firing wherein the temperature is ramp up at a rate between 2° per minute and 15° per minute.

24. (currently amended) The method ~~of~~ according to claim 12 wherein the permeable ~~restraining~~ structure, the fibrous material, and the porous membrane ~~and the impermeable structure forms have respective a geometric shape shapes~~ dependant upon the end use of the ceramic insulating material.